ENVIRONMENTAL ASSESSMENT FOR CROSSTIMBERS PROJECT AT SKIATOOK LAKE, OKLAHOMA

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Project Proponent:

Skiatook Economic Development Authority
Skiatook, Oklahoma

Prepared for:

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

Prepared By:

ALEXANDER CONSULTING, INC.
5802 S. 129th East Avenue
Tulsa, Oklahoma 74134

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I. PURPOSE, NEED AND SCOPE

The purpose of this Environmental Assessment is to assess the environmental impacts from the proposed construction of a golf course, marina and boat service, RV sites and cabins, and a village (the village would consist of lodge, cabins, store, and other related facilities) on Federal lands at Skiatook Lake in Osage County, Oklahoma. Although the Final Environmental Statement for Skiatook Lake, dated 11 February 1972, addresses authorized recreational purposes at this location, significant excavation and changes in the land would result from construction, thus requiring preparation of an Environmental Assessment to assure compliance with the National Environmental Policy Act of 1969, as amended.

Skiatook Reservoir was authorized for construction by the Flood Control Act approved 23 October 1962 (Public Law 87-874, 87th Congress) in accordance with the plan outlined in House Document No. 563 (87th Congress, 2nd Session). Purposes of the Skiatook project included flood control, water quality control, water supply storage, recreation, and fish and wildlife.

The proposed project, consisting of approximately 631 acres of land and 46 acres of water, is located in portions of Sections 25, 26, 27 and 35 of Township 22 North, Range 11 East and Sections 2, 3, and 4 of Township 21 North, Range 11 East in Osage County, Oklahoma (Figures 1 and 2). Access to the site is via State Highway 20 and paved county roads to the project boundaries from the east. North 52 West Avenue and State Highway 11 provide access to the western side of the lake via West 103rd Street. Within the project boundary, access is via government and county roads.

The project includes the development of a golf course, marina and boat service, trails, RV sites, cabins, and a village. The village would consist of a lodge, cabins, store, and other related facilities. A description of each proposed activity and site development map are provided in Figures 3 and 4.

The U.S. Army Corps of Engineers (USACE) currently operates the campgrounds at Skiatook Lake. The Tall Chief Cove camping facility has led USACE Southwest Division campgrounds in revenue for the past three years and experiences 100 percent utilization on the weekends during the camping season (having to turn away campers). A marina leased to the Public Works Authority of Osage County and subleased to a private company, is currently in operation at the lake. The marina is very busy during the summer season with a 90 percent utilization rate.

II. ALTERNATIVES INCLUDING PROPOSED ACTION

A. No Action

This alternative would retain existing conditions and would not result in any project related environmental impacts or loses to fish and wildlife habitat. Existing facilities would remain, resulting in a continued shortage of camping facilities and recreational space within Tall Chief campground at Skiatook Lake.

B. Construct Golf Course, Marina, RV Sites and Cabins, Village, Trails, and Expand Existing Camp and Recreational Facilities at Tall Chief Cove (Proposed Action)

This alternative would provide a high quality, modified "target golf course", a marina, expanded RV sites, cabins, and a village. The "target golf course" concept of golf course development minimizes the disturbance to native vegetation and natural topography by strategically placing course features within the existing landscape. Golf holes, fairways and other features would be framed by existing trees/shrubs, native grasses, hills, and drainages, thereby minimizing excavation and maintenance of extensive tracts of improved turf. Other project construction would also be accomplished with this concept in mind, and would provide a needed increase in camping and recreation areas. Buildings would be constructed in concert with the local environment not at the price of the local environment. All of the proposed facilities would be public facilities.

III. AFFECTED ENVIRONMENT

A. Location

The proposed golf course would be located at Skiatook Point. The course would be built on approximately 318 acres of USACE land located north and west of the dam (Figure 3). The proposed RV park and rustic cabins would be located at Tall Chief Cove Campground adjacent to the existing camping sites on the west end of the campground. The proposed Village is also located at Tall Chief Cove. It would be on the southern end of the campground adjacent to the swimming beach and boat launch. The proposed marina and related facilities would be located at Tornado Cove (to the northeast of Tall Chief Cove). The proposed nature trails would be located from Tornado Cove north to the dam area (Figure 4).

B. Climate

Skiatook Lake lies in a region characterized by moderate winters and comparatively long summers with relatively high temperatures. The summer rains usually occur as thunderstorms of short duration and limited extent but with intense rainfall. The winter rains are generally of low intensities but cover large areas and are several days in duration. Normal annual precipitation over the watershed is about 37.1 inches. May is normally the wettest month and December the driest; however major storms may occur at any time during the

year. Nearly two-thirds of the precipitation occurs during the growing season, April through September. Annual snowfall averages around 8.9 inches per year.

The mean temperature for the area is around 60°F with record extremes ranging from a minus 26°F to a plus 118°F.

The Hominy Creek watershed is in an area of prevailing southerly winds. Greatest wind movements occur in the spring months. A study of available wind velocity data indicates that 45 miles per hour is the highest wind velocity that can be reasonably expected for the duration of one hour or more (Oklahoma Climatological Survey).

C. Social and Economic Conditions

1. Study Area. Osage County is in the extreme north-central Oklahoma and is bordered to the north by the Kansas state boundary line and to the south by the Tulsa metropolitan area. Skiatook Lake is located in the southeastern portion of the county. The lake is operated by the U.S. Army Corps of Engineers. The Tall Chief Cove camping facilities are used at a 100% rate on weekends (turning away a number of individuals during the season). The existing marina is also operated at approximately 90% capacity during the boating season (May through September).

2. Population. The population of Osage County is 44,437 as of the 2000 census. Skiatook area has seen a growth rate of approximately 10% over the last 10 years.

3. Employment and Income. The economy is primarily based on horse and cattle ranching as well as oil and gas production. Unemployment rate in the county was 4.0% in 2001 compared to 4.3% for the State. The 1999 per capita income for Osage County was $17, 634 compared to $22,958 per capita for the State.

4. Social Ecology. Land use in the Skiatook Lake area is mainly ranching, although recent years have seen the slow encroachment of housing developments west of the town of Skiatook and on the eastern end of the Lake. Upscale housing has been built on private property on both sides of the northern end of the Lake. Lake view houses start at $160,000 in the Catalina Cove subdivision east of Tornado Cove. Homes on East Ridge sell in excess of $230,000. Westside homes in the Santa Barbara subdivision start at $180,000, with homes selling in excess of a million dollars in the Beverly Hills subdivision. The median price for a home in the Skiatook area is $63,176 with the average price of a home being $69,601. Only 3.3 % of homes within a ten-mile radius of the Town of Skiatook sell for more than $150,000 (Town of Skiatook Market Profile Report June 15, 2001).

The standard of living on the eastern end of the lake has shown a dramatic shift in the past five to ten years. The increase in housing prices has brought an increase in the amount of land that is being made available for development.

5. Environmental Justice. Executive Order 12898 requires federal agencies to identify and address disproportionately high and adverse human health and environmental

effects of federal programs, policies, and activities on minority and low-income populations. Federal agencies are directed to ensure that federal programs or activities do not result, either directly or indirectly, in discrimination on the basis of race, color or national origin. Federal agencies are required to provide opportunities for input in the NEPA process from affected communities and to evaluate significant and adverse environmental effects proposed federal actions on minority or low-income communities during the preparation of federal environmental documents. The proposed project was evaluated in accordance with E.O. 12898.

6. Protection of Children from Environmental Risks and Safety Risks. Executive Order 13045 requires federal agencies shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Federal agencies are directed to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health and safety risks. The proposed project was evaluated in accordance with E.O. 13045.

D. Natural Resources

1. Terrestrial. Skiatook Lake is located in the Prairie Division, Prairie Parkland Province as described by Bailey (1995). This province covers an extensive area from Canada to Oklahoma, with alternating prairie and deciduous forests. The province occupies 218,200 square miles.

The project area is primarily composed of crosstimbers (upland woods) interspersed with native tall-grass prairie. These forests exist in continuous to scattered stands on sandstone of the Douglas group throughout the Chautauqua Hills. In these areas post oak and blackjack oak, and others grow on rocky land where water is received from sandstone surfaces and snow lodges during the winter.

Prior to impoundment the project areas were mainly upland timberland and native grassland. Since impoundment, the areas have been managed as public use areas for camping and other recreational activities, or left undeveloped. There are no bottomland hardwoods or wetland resources within the scope of the proposed project.

2. Soils. Although several different soil types are present, the predominant soil type in the proposed development area is the Niotaze-Darnell complex. The Niotaze-Darnell complex consists of small areas of Niotaze and Darnell soils that are so intermingled that distinct separation was not possible at the scale selected for mapping purposes. The Niotaze-Darnell soil complex, which forms on the crests and side slopes of uplands, range from moderately deep (Niotaze) to thin (Darnell), somewhat poorly drained (Niotaze) to well drained (Darnell), and are very gently sloping (3%) through moderately steep (25%) in slope.

The Niotaze soils make up about 65% of the mapped acreage. In typical Niotaze soils, the surface layer to a depth of about 3 inches consists of very dark grayish brown silt loam that grades at that depth to a brown silt loam to 6 inches. The upper part of the subsoil is reddish brown silty clay to a depth of 15 inches. The middle part is mottled in shades of red, brown,

and olive silty clay to a depth of 28 inches. The lower part is olive silty clay to a depth of 36 inches. The underlying material of Niotaze soils is shale bedrock. The permeability of the Niotaze soil is slow and available water capacity is medium.

The Darnell soils make up about 15 to 35% of the mapped acreage. In typical Darnell soils, the surface layer to a depth of about 4 inches consists of very dark grayish brown fine sandy loam. The thin subsoil consists of a brown fine sandy loam to an average depth of 13 inches. The underlying material of Darnell soils is sandstone bedrock. The permeability of the Darnell soil is moderately rapid and available water capacity is low.

The Niotaze-Darnell soil complex is used mostly for range, but is also well suited for the growth of native trees (scrub oaks, blackjacks, etc) that are useful as firewood and posts. The smoother, less stony areas are also suited to tame pasture grasses.

3. Prime Farmland. As defined by the U.S. Natural Resources Conservation Service there are no Prime and Unique Farmlands within the scope of this project. Coordination letter from the U.S. Natural Resources Conservation Service is in Appendix A.

4. Wild and Scenic Rivers. No body of water in the Lake Skiatook watershed is a federally designated Wild or Scenic River.

5. Wetlands/Floodplains. The only wetland within the scope of the proposed project is a small fishing pond located in the Skiatook Point area. A fishing pond would be incorporated into the golf course design. See the United States Department of the Interior, National Wetland Inventory (NWI) map, located in Appendix A.

Floodplains are the areas along rivers or lakes that are inundated during periods of flooding. Flooding is an inevitable event along most rivers, tending to be seasonal and caused by spring rains or storm events. Many areas have 50 and 100-year floodplains identified through the Federal Emergency Management Agency (FEMA) for flood insurance programs.

The floodplains around Skiatook Lake have been inundated by Skiatook Lake. The floodplains within the conservation pool elevation of 714.0 National Geodetic Vertical Datum (NGVD) are permanently inundated. The floodplains along Hominy Creek and its tributaries between the conservation pool and top of the dam elevation (756.0 NGVD) may become inundated at various frequencies.

6. Wildlife. The Oklahoma Department of Wildlife Conservation (ODWC) administers the Skiatook Wildlife Management area on the western end of Skiatook Lake. The ODWC manages 5085 acres of property (both land and water) around the area where Hominy Creek flows into the lake. This area contains 3600 acres of upland woods (crosstimbers subdivision) and is open to the public for hunting.

A large variety of rodents, reptiles, amphibians, and birds are plentiful throughout the region. A comprehensive list of all flora and fauna is available in the Final Environmental Statement for Lake Skiatook (USACE 1972).

a. Fish. Skiatook Lake has an excellent reputation as a prime fishing area. The primary sport fish species are largemouth bass, spotted bass, smallmouth bass, white and black crappie, white bass, walleye, channel catfish, blue catfish, flathead catfish, and white bass/striped bass hybrid. Sport fish have been stocked yearly in the lake since 1987 with hybrid striped bass being stocked in the greatest number in recent years.

Stresses on the aquatic ecosystem at Lake Skiatook include anoxic summer conditions and lake level fluctuations.

b. Amphibians and Reptiles. Species found are typical of the crosstimbers area and include such species as terrestrial and aquatic snakes, turtles, lizards, skinks, frog, toads and salamanders.

c. Birds. Species found are typical of the crosstimbers area and include such species as harriers, hawks, doves, kingfishers, woodpeckers, chickadees, titmouse, mocking birds, eastern bluebird, loggerhead shrike, starling, blue jay, crow, sparrows, eastern meadowlark, crackle, cowbird, cardinal, junco and scissor-tailed flycatcher.

d. Mammals. Species found are typical of the crosstimbers area and include such species as white-tailed deer, rabbits, squirrels, coyote, raccoon, bobcat, possum, woodchuck, foxes, muskrat, striped skunk, mink, bats and beaver.

7. Unique Habitat Resource. The project area contains an increasingly rare and unique habitat type, the crosstimbers. This component was identified as being present in the project area during preparation of the final environmental statement for the project in 1972, but the status of this habitat type has recently been of concern and reevaluated by the scientific community. The crosstimbers originally stretched from southeast Kansas, through eastern Oklahoma to northeastern Texas. This vegetation type is dominated by blackjack oak, post oak and (in the south) black hickory (*Carya texana*), with an understory dominated by little bluestem. Subdominants include big bluestem, side-oats grama, hairy grama (*Bouteloua hirsuta*), purple lovegrass (*Eragrostis spectabilis*), sand lovegrass (*E. trichodes*), Scribner's panicum, Indian-grass, longleaf dropseed and Texas needlegrass (*Nasella leucotricha*) (*Stipa leucotricha)* as understory, and hackberry (*Celtis* spp.) as an overstory species. In Oklahoma the crosstimbers prairie habitat type originally covered approximately 30,000 square miles. Therrell and Stahle (1998) estimate 162 square miles of ancient crosstimbers remain today throughout the country, all of which has been impacted by fire suppression, grazing/agriculture, and reservoir impoundment.

Within the general habitat classification of crosstimbers there are several different plant communities. The plant community with the broadest distribution is that of the upland crosstimbers. The upland crosstimbers forest type is generally considered to be a modified version of the oak-hickory forest type that is common along the western portion of the eastern deciduous forest of North America, the major distinction being the lack of the other species of oak and hickory common in the eastern North America as well as the lack of black cherry and basswoods. In many places throughout the crosstimbers region sandstone or

limestone caps many of the hills. Soils associated with the sandstone caps are mostly thin sandy soils and contain unique plant communities generally consisting of small annuals or succulent perennials with very short tap roots, or shallow spreading roots.

Throughout much of the eastern range of the crosstimbers a combination of fire suppression, plant invasion, and conversion to agriculture has resulted in the fragmentation and loss of habitat for many migrant songbirds such as the endangered black-capped vireo.

One component of this habitat type, is "old growth" or ancient crosstimbers, which is composed of growth forms that may be 300-500 years old. Tree ring investigations indicate that the ancient cross timber community has remained relatively unchanged following the last glacial period some 6,000 years ago (Stahle et.al., 2000). Due to the rapidly declining trends in this habitat type the value and function of the old growth crosstimbers is of special importance. Little is known about the bird communities in these ancient forests.

It has been conjectured that portions of the proposed project area have a 77 % chance of containing old growth crosstimbers (Therrell and Stahle 1998), but the project area has not been surveyed for this growth form. Prior to project implementation, a survey will be conducted to quantify this habitat type.

E. Cultural Resources

The project area is situated in a zone of low oak-covered hills, which form the boundary between the grasslands of the Plains to the west and the oak-hickory forests to the east. The project area lies at an elevation between 714 and 850 feet U.S. Geological Survey topographic data. The uppermost sediments are composed principally of dark gray silty clays and clay loams related to the Ferris-Tarrant-Heiden Association. The sediments tend to be rocky and thin over much of the area, with some outcrops of limestone and/or sandstone.

As an area of research, the project area falls within the Southern Great Plains archeological province. A cultural-historic overview of the surrounding region is beyond the scope of this report; however, a detailed account is given in various USACE publications. Most notable of these publications are The Archeology of the Proposed Skiatook Reservoir, Osage County, Oklahoma (Rohrbaugh and Wycoff 1969), An Historical-Cultural Assessment of the Skiatook Reservoir, Osage County, Oklahoma (Perino 1972), The Prehistory and Paleoenvironment of Hominy Creek Valley 1978 Field Season (Henry 1979) and The Prehistory and Paleoenvironment of Hominy Creek Valley 1979 Field Season (Henry 1982).

F. Threatened and Endangered Species

The interior least tern, whooping crane, bald eagle, piping plover, mountain plover, and neosho mucket have been listed by the U.S. Fish and Wildlife Service as Federally listed threatened, endangered, or candidate species that may occur in the project area (Appendix B).

G. Water Quality

USACE has characterized the general water quality at Skiatook Lake as having macronutrients and trace metals at levels and patterns not a cause for alarm but that do warrant future study (USACE 1998). Phosphorus is at levels high enough to consider the lake mesotrophic. Mesotrophic lakes show some depletion of oxygen making them not always suitable for coldwater fisheries, although productivity is good. Shifting land use patterns in the watershed could shift the entire lake into a higher trophic level (eutrophic). Eutrophic lakes show a reduction in aesthetics due to turbidity, but generally are very productive for warm water fisheries. The second area of awareness is in the trace metals. Mercury levels were above detection limits in five surface water samples. This survey provided water quality baseline data for Skiatook Lake with samples taken between April and November 1994.

Since that time, the Oklahoma Water Resources Board (OWRB) has measured water quality in Skiatook Lake. Data gathered in 1996, 1999 and 2000 show that Skiatook Lake is still classified as mesotrophic, bordering on eutrophic. A mesotrophic to eutrophic lake is one that is indicative of moderate to high primary productivity and intermediate nutrient levels. According to the ODEQ, Skiatook Lake was sampled in 1998 and none of the fish samples exceeded screening level or low consumption advisory level for metals toxicity. Skiatook Lake is listed on the current (1998) State of Oklahoma 303(d) list of impaired waters for pesticide concerns from unknown sources.

H. Air Quality

The U.S. Environmental Protection Agency (USEPA) published a Conformity Rule on 30 November 1993, requiring all Federal actions to conform to appropriate State Implementation Plans which were established to improve ambient air quality. At this time, the Conformity Rule only applies to Federal actions in non-attainment areas. A non-attainment area is an area which does not meet one or more of the National Air Quality Standards for the criteria pollutants designated in the Clean Air Act (CAA).

To comply with this rule, a conformity determination based on air emission analysis in required for each proposed Federal action with a non-attainment area. This geographical region is in attainment and meets the National Air Quality Standards for the criteria pollutants designated in the CAA. Consequently, a conformity determination is not required.

I. Noise. Noise levels in the project area are consistent with an area that is experiencing a growth in population levels. Various housing areas are in the process of development and construction in the proposed project area. To the north of the Skiatook Point (proposed golf course) a variety of housing areas are currently being built. The area to the south of Tornado Cove (proposed marina) has been cleared and multiple houses are being built. The land south of Tall Chief Cove Camp ground is currently being developed for single resident housing.

IV. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

A. SOCIAL AND ECONOMIC IMPACTS

1. FUTURE WITHOUT PROJECT CONDITIONS

a. Population. Under without-project conditions, population trends of the past decade would continue. Recreational use is expected to grow along with the population.

b. Employment and Income. The unemployment rate is expected to remain slightly lower than the state level. Ranching would remain the important part of the local economy, but the local economy will become less labor intensive. The income level of persons living in Osage County is expected to stay well below the income level of persons living in other parts of Oklahoma.

c. Social Ecology. Building of upscale homes and subdivisions would continue on the eastern end of the lake. Living standards would continue to rise as development increases in the general area.

2. FUTURE WITH PROJECT CONDITIONS

a. Population. The project could have a direct, though minor, impact on the number of people living in Osage County. The project would have a direct impact on those using the Skiatook Lake facilities. Population trends of the past decade should continue. Construction may temporarily increase noise and traffic. Specifically, traffic patterns on Lake Road may be temporarily disrupted due to construction. Construction of the golf course, marina, convention facility, and campground would increase recreational opportunities for the local population as well as for those persons living in other locales. The new facilities should generate additional visitation to the Skiatook Lake area.

b. Employment and Income. Projected construction would increase job opportunities in the area. When all phases of the project are in operation approximately 50–60 new jobs would be created, making the CrossTimbers one of the major employers in the local area. In the long-term unemployment rate should remain slightly lower than the state. Construction related expenditures should increase local income. Income for local residents should remain slightly lower than in other more urbanized areas of Oklahoma.

c. Social Ecology. The project would be consistent with the local development. The eastern end of Skiatook Lake has seen an increase in housing development in the last five to ten years. Rural Water District 15 (RWD 15) reports that 325 new houses were built in this area in the last five years.

Water to the proposed project would come from RWD 15, which receives its water from the town of Skiatook. The town of Skiatook does not have enough storage from Skiatook Lake to meet the proposed demands. RWD 15 has a 2000 acre-foot future use water storage contract at Skiatook Lake. This storage is from the originally authorized water supply storage. As the proposed project is developed, RWD 15 would activate the water storage

contract from future use to a present use status. The town of Skiatook would treat water from RWD 15's water storage to insure the demands for the phased development of the proposed project are met. The town of Skiatook is expanding the water plant to meet future needs of the Skiatook area. Water to irrigate the golf course would be bought from the town of Skiatook. Sewage treatment would be on site. A variety of methods for sewage disposal, such as aerobic systems and wetland systems, are being investigated. Systems that are used would comply with all applicable state and federal laws and regulations regarding wastewater treatment.

Traffic flow to the area would come from the North on SH 20 either via Lake Road or via Rogers Blvd and from the South via W. 103rd St. to Lake Road. This is the normal traffic pattern today. Noise in the area is expected to increase during construction and then to be consistent with the project activities.

The aesthetics of the proposed development are of utmost importance. The proposed CrossTimbers project is being built to be consistent with its surroundings, with existing facilities in Oklahoma and Missouri being used as templates for project design. The standard of living would also benefit with the proposed development through an increase in employment and land values.

d. Environmental Justice. In accordance with Presidential Executive Order 12898, a review of this project was evaluated in terms of its effect of excluding persons (including populations) from participating in; denying persons (including populations) the benefits of; or subjecting persons (including populations) to discrimination because of their race, color, or national origin. The review indicates that no such effects would result from the project.

e. Protection of Children from Environmental Health Risks and Safety Risks. In accordance with Presidential Executive Order 13045, a review of this project was evaluated in terms of any health risks and safety risks that may disproportionately affect children. The review indicates that no such effects would result from the project.

B. NATURAL RESOURCES IMPACTS.

1. Terrestrial. Temporary disturbance to soils and existing vegetation would occur from construction activities (i.e., shaping, excavation, and sodding with turf). Of the total 318 acres in the proposed golf course, approximately 150 acres would be potentially disturbed for construction. In addition, other potentially disturbed acreage would include 40 acres for the Village, 5 acres for the Marina, and 30 acres for the camping/RV park extension with modest additional development occurring within the balance of the project area for nature trails and other facilities as suggested by the development plan. About one third this area is open and the other two thirds is timbered (see Table 1). Losses to existing hardwoods within the designated construction areas should be minimal. Disturbance to shoreline riparian and timber habitats should be minimal or non-existent, as these habitats

would be left in place to provide an aesthetic buffer zone and to minimize maintenance. Disturbance to and conversion of existing crosstimbers vegetation would occur for construction of the marina, golf course and village.

TABLE 1

Estimated Wildlife Habitat Type to be Altered by the Proposed Project

	Prairie	Interspersed Forest	Forest edge	Closed Canopy Forest	Riparian	Aquatic	Total
Golf Course	45 acres (30%)	0 acres	15 acres (10%)	90 acres (60%)	0 acres	0 acres	150 acres (58%)
Marina	0 acres	0 acres	0 acres	3 acres (8%)	2 acres (5%)	30 Acres (86%)	35 acres (13%)
Village	8 acres (20%)	0 acres	2 acres (5%)	30 acres (75%)	0 acres	0 acres	40 acres (15%)
RV/Camping	18 acres (60%)	10.5 acres (35%)	1.5 acres (5%)	0 acres	0 acres	0 acres	30 acres (12%)
Hiking Trail	0 acres	0 acres	0 acres	5 Acres (100%)	0 acres	0 acres	5 acres (2%)
Total	71 acres (27%)	10.5acres (4%)	18.5 acres (7%)	128 acres (50%)	2 acres (1%)	30 acres (11%)	260 acres (100%)

There is a possibility that old growth trees exist in the project area. Prior to construction the project proponent would be required to have a recognized authority on old growth crosstimbers conduct a survey of the entire lease area to identify any old growth crosstimbers that may exist in the lease area. Results of the survey will be provided to USACE. Once development plans are finalized, USACE and the project proponent will jointly assess potential impacts to old growth trees. Prior to disturbance of any old growth forest resources, finalized plans must be approved by the USACE members of the Skiatook Lake Demonstration Lake Project Delivery Team. This requirement will also be made a condition of the real estate lease to SEDA.

2. Prime and Unique Farmlands. As defined by the U.S. Natural Resources Conservation Service there are no Prime and Unique Farmlands within the scope of this project (Appendix A).

3. Aquatic and Wetlands. Nutrient loading from fertilization applications and contamination from pesticides use at the golf course should be minimal due to efforts

taken to maximize the integration of existing undeveloped lands into the project design. A detailed turf management and Integrated Pest Management Plan would be used to properly apply fertilizers, herbicides and pesticides (see golf course design guidelines in Appendix C). A buffer of existing shoreline habitats, composed of crosstimbers, riparian species, natural plants and grasses to maintained areas (bermuda grass) should be ideal for natural assimilation and/or decomposition of possible pollutants. The cross timber trees, shrubs, and grasses should also serve as indicators of excessive herbicide application because of their sensitivity to these products. At the Marina, proper operation and maintenance of equipment and strict adherence to state and federal regulations should help maintain the water quality of the lake.

Proper construction and operation of the proposed golf course, marina and village facility, as designed, should not impact existing aquatic resources.

4. Fish and Wildlife. The construction of a "target golf course" may benefit some wildlife species and adversely impact others. Foraging species may benefit from increased food availability provided by clearing of the underbrush. However, neotropical bird species that utilize the crosstimbers could be adversely impacted. In coordination with USACE and USFWS, bird and small mammal habitat would be added where possible throughout the project. As with any construction project, some species would be displaced. Also, a variety of wetland areas would be added in the construction of the golf course (see golf course design guidelines section of Appendix C).

Loss of habitat would be minimized as much as possible in all areas of development. Fish habitat, approximately 30 acres, which would be removed in the construction of the marina, would be added in other areas of the lake as directed by a plan developed in association with the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and the Oklahoma Department of Wildlife Conservation. Other construction is proposed within the heavily used Tall Chief Cove campground area, where wildlife has either been displaced or adapted to human occupancy.

5. Migratory Birds. The potential impacts of the proposed development to migratory birds have been evaluated. The proposed lease to SEDA should not impact the Corp's ability to protect migratory birds from deleterious impacts. According to, "Partners in Flight, Bird Conservation Pan for the Osage Plains" (*Physiographic Area 33, American Bird Conservancy, Version 1.0, October 2000*), the physiographic area of the proposed development consists of grass-shrublands and Savanna-woodlands.

In grass-shrublands, the breeding bird species that appear to be increasing consist of the Bewick's Wren and Blue-gray Gnatcatcher, while declining species consist of the Western Kingbird, Eastern Kingbird, Scissor-tailed Flycatcher, Loggerhead Shrike, Bell's Vireo, Brown Thrasher, and Lark Sparrow. With the proposed project this trend would probably continue.

In Savanna-woodlands, the breeding bird species that appear to be increasing consist of the Wild Turkey, Eastern Bluebird, Indigo Bunting, Carolina Chickadee, Tufted Titmouse,

White-breasted Nuthatch, and Carolina Wren. The declining species consist of the Red-headed Woodpecker, Northern Flicker, Western Kingbird, Eastern Kingbird, Scissor-Tailed Flycatcher, Loggerhead Shrike, and Brown Thrasher. With this project this trend would probably continue.

6. Impacts on Fishing and Hunting Opportunities. The proposed project would have an additional impact on the existing fishery resource and fishing opportunities. With the proposed marina development, the cove would be cleared of standing timber (30 acres), which could impact the fishery resources of the lake. The standing timber attracts and provides cover for sport fish such as crappie, largemouth bass, and catfishes. It also provides cover for young of the year sport fish and prey species such as shad, and provides an attachment point for algal communities that provide food and cover for many species of fish. To date the value of this habitat type has not been quantified or evaluated by a habitat-based evaluation. As such, impacts are uncertain. However, mitigation features to offset this loss would be coordinated with USACE, USFWS, and ODWC and installed prior to completion of the proposed project. Mitigation features may include construction of new brush piles or other sport fish attractors that could provide fish habitat and algal resources for sport fish.

The immediate area around the marina may be zoned off limits to the general public. This is permissible under Corps regulations so that the marina operator can provide security for the facilities and also protect the private property of marina patrons. This zoning would not prohibit boaters or fishermen from gaining access to the cove, and would be posted in accordance with applicable Tulsa District marina policies and guidelines.

Skiatook Point and Tall Chief Cove are part of the proposed lease area. These areas are zoned for intensive recreation use and are closed to hunting. The area from Skiatook Dam south to Tall Chief Cove (approximately 200 acres) is currently zoned for low-density recreation and has been open for archery hunting only in accordance with ODWC regulations. Just over 100 acres of this shoreline (in the vicinity of the marina and cabins development) would be rezoned to recreation intensive use and would not be open to hunting. The remainder of the shoreline (from the cabins to Skiatook Dam) would remain zoned for low-density recreation. However, the proposed use of this shoreline area for a hiking trail would probably result in hunting being restricted in this area during all or portions of the different hunting season. To offset this loss of hunting opportunities, USACE would consult with USFWS and ODWC on rezoning a currently undeveloped recreation area at Skiatook Lake to multiple resource management - wildlife management general. Designation of the property as such would allow hunting and management of habitat for wildlife and non-game species to take place on this portion of the lake, potentially offsetting the loss of hunting opportunities due to the proposed lease.

7. Threatened And Endangered Species. This project would not impact Federally-listed or State-listed species. The USFWS listed four threatened or endangered species, one proposed threatened species, and one candidate species as occurring in Osage County. All of the federally listed threatened and endangered species potentially migrate through the Skiatook Lake area, but there is no critical habitat listed for them in the

proposed project area. Information regarding surveys for Federally listed species is included in Appendix B.

8. Wetlands/Floodplains And Water Quality Permits. No existing wetlands as identified by the USFWS (NWI) would be negatively impacted by the project. Additional wetlands would be constructed as part of the golf course project. All permanently inhabitable buildings would be in an area outside of the 50-year flood plain. A National Flood Insurance Program Map (Federal Emergency Management Agency) is in Appendix A. The project, as planned, would have no impacts on the floodplain of Hominy Creek. The project was coordinated with the Floodplain Management Section of the Tulsa District Corps of Engineers in accordance with Executive Order 11988, and their response is shown in Appendix A.

7. Cultural Resources. A cultural resources survey of the proposed project area was conducted by Dr. Donald Henry of the University of Tulsa in May 2002. No archeological sites were recorded during this survey. One traditional cultural property, called Tepee Rock or Healing Rock (34OS679), was identified near the current USACE office and within the area proposed for construction of the golf course. No other historic properties were recorded during this survey. As part of our consultation under Section 106 of the NHPA, copies of this report were also submitted at that time to the Quapaw, Osage, Kiowa, Comanche, and Wichita and Affiliated Tribes for their review, and a request was made to each of these groups for their assistance in identifying cultural properties that may be of traditional religious or cultural significance to them that might be located within the proposed lease area. In a letter dated August 5, 2002, the Osage Nation responded to our request for information by stating that the activities associated with the proposed recreation development of the lease area would have an adverse impact on Healing Rock and potentially other historic properties that may be located within the proposed lease area. The Osage Nation also requested that consultation take place between the Osage, State Source, SEDA, and USACE regarding the impact of the proposed project on Healing Rock and other matters.

Healing Rock, 34OS679, is a large upright rock located on a ridge point overlooking Skiatook Lake. Originally located in Hominy Creek valley, the rock was moved to its present location by USACE at the request of the Quapaw and Osage tribes in order to prevent the rock from being inundated by Skiatook Lake. According to informants, Healing Rock is a traditional cultural property of significance to the Quapaw and Osage tribes due to association with some of the first Native American Church gatherings held in Osage County. Consultation with the Osage Nation and Quapaw Tribe by USACE in 2002 and 2003 revealed that both tribes still feel Healing Rock is a significant traditional cultural property in spite of the fact that the rock is no longer located in its original setting. Based on information provided by the Osage Nation and Quapaw Tribe, USACE determined that Healing Rock is eligible for listing on the National Register of Historic Places (NRHP) as a traditional cultural property. The Oklahoma State Archeologist and the Oklahoma State Historic Preservation Officer have concurred with our opinion of NRHP eligibility regarding Healing Rock (Appendix D).

Shortly after initiation of formal consultation with the Osage Nation and Quapaw Tribe in October 2002 USACE was made aware of a previously unknown historic property located within the boundary of the proposed lease area. Site 34OS678 is a small, burned rock mound approximately 10 meters in diameter and 0.5 meters in height located in the front yard of the USACE Skiatook Lake office. Based on similarities to other known sites in the region, the site appears to be prehistoric in age. From aerial photographs and other documentation on file at the USACE Skiatook Lake office, the mound appears to have escaped disturbance during the construction of the nearby office compound during the 1980s. Because of the undisturbed nature and likelihood of the mound containing important information on subsistence activities of prehistoric inhabitants in the area, we feel that site 34OS678 is potentially eligible for listing on the NRHP. The Oklahoma State Archeologist has concurred with our determination of NRHP eligibility regarding this site (Appendix D).

Due to the presence of site 34OS678 in an upland ridgetop setting, it was decided through consultation with the Osage and Quapaw tribes that additional cultural resource survey efforts were warranted in the area proposed for construction of the CrossTimbers golf course. As a means of enhancing ground visibility during the survey, in November 2002 USACE undertook a prescribed burn of nearly the entire area that would be used for the proposed golf course. As a result of the prescribed burn, many areas that were formerly covered in dense prairie grasses were available for easy surface inspection.

Surface survey of the proposed golf course area began on November 19, 2002. USACE archeologists Louis Vogele and Ken Shingleton spent the entire day walking through the recently burned area, focusing most of their effort on that portion of the property located south of the highway. On November 21, 2002, Anthony Whitehorn of the Osage Nation, Carrie Wilson of the Quapaw Tribe, and Natalie Garrett of the Bureau of Indian Affairs joined Mr. Vogele in surveying the western portion of the area north of the highway. On November 26, 2002, Mr. Vogele and Mr. Shingleton returned to complete the remaining survey work in the northeastern portion of the area. In addition, Mr. Whitehorn, Ms. Wilson, and Ms. Garrett accompanied Mr. Vogele and other USACE employees on December 11, 2002 in a boat shoreline survey of the eastern shore of Skiatook Lake.

As a result of the surveys undertaken in November and December 2002 of the proposed CrossTimbers golf course area, two additional historic properties were discovered (Henry 2002). As documented in the report and site forms prepared by Dr. Donald Henry of the University of Tulsa, sites 34OS676 and 34OS677 are historic period archeological sites that are 20th century in origin. Site 34OS676 is composed of the remains of a 1930 oil well drilling location, while site 34OS677 is the remains of the John H. Rogers farmstead occupied from the 1930s – 1970s. USACE agrees with the recommendations of Dr. Henry that sites 34OS676 and 34OS677 are not eligible for listing on the NRHP. The Oklahoma State Archeologist and the Oklahoma State Historic Preservation Officer have concurred with our opinion that these sites are not eligible for listing on the NRHP (Appendix D).

As previously indicated, USACE began formal consultation with the Osage Nation and the Quapaw Tribe regarding the proposed CrossTimbers development in October 2002. During the consultation the Osage and Quapaw expressed concerns that golfers utilizing the

CrossTimbers golf course might display behavior at Healing Rock that the tribes consider inappropriate in the context of this traditional cultural property. With this concern in mind, options to minimize the likelihood of such activities taking place at Healing Rock were explored by USACE, SEDA, and the Osage and Quapaw tribes. Ultimately, these discussions lead to two government-to-government meetings between the parties on-site at Healing Rock. The last of these meetings, held January 3, 2003, resulted in a verbal agreement between USACE, SEDA, and the Osage and Quapaw tribes that Healing Rock and the access trail to Healing Rock leading from the USACE Skiatook Lake office would be excluded from the proposed lease area (Figure 5). In order to allow public access to the site while minimizing the likelihood of inappropriate golfer behavior at Healing Rock, the following provisions were agreed to by all parties: 1) an area 100 feet on all sides of Healing Rock and approximately 50 feet on either side of the Healing Rock access trail will be excluded from the proposed SEDA lease area and removed from development as part of the CrossTimbers golf course; 2) the trail and excluded area around Healing Rock will be maintained as part of the maintenance agreement for the USACE Skiatook Lake office compound; and 3) provisions will be established in the SEDA lease agreement and any sub-lease agreement to address future inadvertent discoveries of cultural resources within the entire area proposed for lease.

To summarize, cultural resources surveys conducted in 2002 within the proposed SEDA lease area identified a range of cultural resources present. Sites 34OS676 and 34OS677 are both historic 20th century archeological sites that have been determined to be ineligible for listing on the NRHP. Site 34OS678 appears to be a relatively undisturbed prehistoric burned rock mound. Site 34OS678 has been assessed as being potentially eligible for listing on the NRHP. This site is located in the mowed front yard of the USACE Skiatook Lake office, and as such will be excluded from the proposed SEDA lease area along with the remainder of the office compound. Site 34OS679 is Healing Rock, a large upright rock associated with early Native American Church activities in the area and relocated to its current position by USACE in 1986. Consultation between USACE, SEDA, and the Osage and Quapaw tribes have led to an agreement to remove Healing Rock and the access trail from the proposed lease, to require the access trail and area around Healing Rock to be maintained by the leasee or sub-leasee, and that provisions will be inserted in the SEDA lease agreement and any sub-lease agreement to address future inadvertent discoveries of cultural resources in the area proposed for lease. All parties have agreed that these actions concerning Healing Rock and the access trail will minimize the likelihood of inappropriate behavior at Healing Rock while continuing to allow public access to the site.

Because USACE, SEDA, and the Osage Nation and Quapaw Tribe have agreed to exclude sites 34OS678 and 34OS679 from the proposed SEDA lease area and future development associated with the lease, USACE feels that the proposed lease of the identified property to SEDA will have no adverse effect on historic properties. The Oklahoma State Archeologist and the Oklahoma State Historic Preservation Officer have agreed with our determination of no adverse effect on historic properties regarding this proposed lease (Appendix D).

8. Water Quality. Surface water quality impacts associated with the proposed golf course could conceivably occur in three aquatic environments: (1) Skiatook

Lake, (2) Hominy Creek below Skiatook Dam (for the portion of the golf course draining to this system), and (3) constructed surface waters on the golf course. Potential contaminants could be transported to these systems via surface or subsurface flows. Chemical constituents of potential concern could include nutrients (nitrogen and phosphorus) from fertilizers, pesticides and herbicides, and sediment. Excessive nutrients are of concern in surface waters owing to their ability to promote excessive algae growth. At elevated concentrations, pesticides and herbicides can negatively impact aquatic organisms or result in contamination of waters used for water supply purposes. Decreased water clarity, loss of storage capacity, and reduced aesthetics are among potential detrimental impacts associated with excessive sediment transport to surface waters.

The area of the proposed golf course on Skiatook Point is estimated at 318 acres. Approximately 198 acres is included in the Skiatook Lake watershed while the remaining 120 acres drain to Hominy Creek below Skiatook Dam. Accordingly, any runoff from approximately 36% of the golf course area would not enter Skiatook Lake. The topography of the golf course within the watershed includes rolling hills that vary from 720 to 900 feet in elevation consisting primarily of Blackjack and Post Oak forests. The forested areas are dense canopy with minimal vegetation. Sandstone surface rocks are significantly interspersed throughout the forests. Prairie grass exists primarily on the man-made features of pipeline easements and road shoulders. For the Hominy Creek watershed, depending upon the precise design of the golf course, the distance from the proposed golf course to the creek would be greater than 500 feet through Blackjack and Post Oak forests.

Primarily due to the topography of Skiatook Point, it is economically infeasible to totally contain surface runoff from the golf course. Therefore, the golf course would include several design features intended to mitigate potential impacts upon the water quality of Skiatook Lake and other surface waters. These features include a buffer of natural vegetation between the maintained turf and the water's edge which would average 125 feet for slopes less than 10% and 200 feet for slopes greater than 10%. Forests within the buffer zone would be selectively thinned to increase the amount of sunlight at ground level to promote dense cover vegetation. This vegetation would better retain and absorb sediment and nutrients, keeping them from reaching the lake. Natural vegetation would be enhanced with additional plant varieties (e.g. poplar and cottonwood trees, grasses such as buffalo and couch, ferns and other low-growing plants) that have been proven effective in absorbing nitrogen and phosphorous. These plant varieties have been successfully used downstream of cattle pastures to protect downstream water sources from high nitrogen and phosphorous levels (See "Using Buffers to Reduce Sediment," http://www.rivers.gov.au/acrobat/techguidelines//tech_guide_vol2_chapd.pdf; and "Conservation Buffers and Water Quality," http://www.ipm.iastate.edu/ipm/icm/2000/6-12-2000/consbuffers.html). While desirable from a water quality standpoint, thinning of the buffer zone area could have an adverse effect upon the quality of the crosstimbers ecosystem. Infiltration trenches may be used to enhance the performance of the buffer zone next to the golf course.

Additional design features or construction techniques to supplement the buffer zone would include the following:

(1) Man-made and constructed wetlands, ponds and other water features would be used to collect surface runoff and prevent potential contaminants including nutrients (nitrogen and phosphorus) from fertilizers, pesticides and herbicides, and sediment from being transported to the lake. A study by Purdue University's Environmental Sciences and Engineering Institute determined that that proper use of fertilizers and pesticides on golf courses does not add any chemicals to surface or ground water. Purdue University Professor Zachary Reicher indicates. "In fact, the grass itself actually will use or trap most of the nutrients and chemicals contained in runoff from adjacent areas." (See http://news.uns.purdue.edu/html4ever/020708.Reicher.wetlands.html).

(2) Infiltration trenches adjacent to Sand based putting greens drained to gravel sumps or to man-made water features.

Small sedimentation ponds would be constructed upstream to reduce nutrient and sediment deposits from impacting the water quality of wetlands and water features.

(3) Berms and swales adjacent to or incorporated into tees, fairways, and roughs to direct and/or collect runoff discharged into man-made water features.

A Turf Management Plan, to be included in the CrossTimbers Environmental Management Plan (EMP), would specify types, amounts, and usage frequency of turf management chemicals to be used on the golf course. All applied products would be EPA approved. These chemicals are non-persistent, short-lived, degradable, and non-mobile. Where practical, foliar applied liquid fertilizers would be used that are readily absorbed by the turf, thereby minimizing their availability for runoff. Granular fertilizers used to supplement liquid fertilizers are made by Nature Safe (www.naturesafe.com). These products include slow-release organic fertilizers enhanced with food energies from yeast, sugars, carbohydrates, proteins, fats, vitamins and enzymes. Together these ingredients increase the natural soil microbes which aid in turf rooting, stress tolerance and disease management. They also contain humus as a soil condition to buffer salts and improve the nutrient holding capacity of soils. They are low salt index organic fertilizers ideal for hot weather application to promote turf recovery and increase wear and stress tolerance. The cumulative effect of these types of products in turf management increases the performance of the turf to filter, trap, and absorb potential contaminants and sediment and prevent these contaminants from entering surface or ground waters.

The primary objective of the fertility program to be used on the CrossTimbers Golf Course would be to create a soil environment where sufficient nutrients are available for optimal plant health with minimal risk to water quality. Studies conducted by Michigan State University have proven that healthy turf along with thatch bind most all of the applied nitrogen. Unused nitrogen is consumed by microorganisms which, when they die, release nitrogen as complex forms of N that do not move downward to any extent in soils. Natural organic and slowly soluble fertilizers would be used in conjunction with liquid fertilizers. These forms of fertilizers are non-mobile and timed to release nutrients for staged uptake by the turf. In order to reduce the amount of nutrients having to be applied, mowing practices

would include "grasscycling". Returning the grass clipping to the maintained turf provides four pounds of nitrogen, ½ pound of phosphorus and two pounds of potassium for every 100 pounds of dried grass clippings (according to North Carolina State University). No fertilizer would be applied within the natural buffer area between the maintained turf and Skiatook Lake.

All products to be used on the CrossTimbers Golf Course would have been thoroughly tested by the manufacturer and approved by the Environmental Protection Agency (EPA) before registration and release to the public. All applications would be made by a licensed applicator in accordance with State of Oklahoma requirements. Products would be selected for use based upon published charts listing maximum recommended application rate of active ingredient per acre and a leaching potential rate. Products used would be chosen to minimize risk of impacting water quality. No products would be applied within the natural buffer area between the maintained turf and Skiatook Lake.

Additional mitigating management programs which would be included in the EMP include an Integrated Pest Management Plan which would determine thresholds for pesticide usage thereby reducing the availability of pesticides as a potential contaminant; and a fertigation system which would be used to apply fertilizers on a continuous basis. This application process maximizes the absorption of fertilizers by plants thereby reducing the availability of fertilizers as a potential contaminant to ground and surface waters.

Potential contaminants from marina operation include petroleum products, i.e., oils and gasoline, and solid waste. The marina would be designed to minimize impacts to lake water quality. Strict adherence to state and federal regulations coupled with proper maintenance and material-handling procedures should ensure a minimum impact to water quality from marina operations. The marina management plan would contain procedures and instructions for safe guarding the lake water quality (see marina environmental features sheet in Appendix C). The possible restriction of only allowing boats with 4-stroke motors to lease space at the marina would be investigated.

In order to minimize or eliminate temporary impacts to water quality during the construction of the golf course, village, and related features, as well as during turf establishment, measures would be taken to reduce impacts (i.e. stormwater construction permits and appropriate protective measures). A stormwater management plan would be required during operation of the facility. All applicable laws and regulations concerning stormwater management would be followed during the construction and operation of the project.

In order to ensure water quality protection, sufficient detail regarding chemical application rates, qualifications and training of grounds maintenance and chemical application personnel, and other personnel involved in golf course operations would be provided in the EMP as described in Section V of this document.

9. Air Quality. Conformity to the 1993 Conformity Rule (USEPA) for ambient air quality is not necessary because no foreseeable emissions from activities of this proposed project would result in a non-attainment area. Skiatook Lake is not located in a

non-attainment area as described by the Clean Air Amendments of 1990, the USEPA, or the U.S. Army Environmental Hygiene Agency (USAEHA 1990).

10. Noise. Construction of the proposed golf course, RV park, marina, and village would result in the temporary increase in noise levels in the project area. The types of construction equipment that would likely be used in the project area (e.g., tractor, loader, or backhoe) would generate noise levels of 80-90 dBA at a distance of 50 feet (Jones & Stokes 1998). The operation of construction equipment can vary from intermittent to fairly continuous and many pieces of equipment can operate at the same time. Assuming a bulldozer (87 dBA), backhoe (90 dBA), and front-end loader (82 dBA) are operating simultaneously in the same area, peak construction-period noise could be approximately 94 dBA at 50 feet for the construction sites (Jones & Stokes 1998).

Although construction-related noise levels could occur in the construction areas of the project during the initial construction period of up to 2 years, these effects are considered relatively minor for the following reasons: construction noise effects would be temporary, the period of most intense construction activity would occur in a relatively short period of time (several months) for golf course layout that is near to any residence, and most construction would occur in areas that are not sensitive to noise.

C. INDIRECT AND CUMULATIVE EFFECTS.

Cumulative effects from construction of the projects include loss of natural habitat. Approximately 150 acres for the golf course would be placed under planned maintenance. All of this, except approximately 6.5 acres, would be covered in a variety of plants and grasses. Native species of plants and grasses would be used when practical.

The marina would use approximately 30 acres of water and 5 acres of land. The village and cabins would use approximately 40 acres of timbered and grassland property. The extension of the campground would use approximately 30 acres of mostly open grassland property (see Table 1).

Impacts to water quality (surface and ground water) and wildlife (flora and fauna) would depend on the quality of golf course design and maintenance. Excessive application of fertilizers could result in nutrient loading into the lake and/or nitrate contamination of ground water. The use of insecticides and herbicides could result in either temporary or sustained damage(s) to the terrestrial and aquatic ecosystems within and adjacent to the protected area, depending upon the pesticide product(s) used. Non-point source inputs to the lake and ground water from these applications are moderated by the frequency of use, quantity per application, assimilation by vegetative ground cover, precipitation duration and frequency, soil drainage characteristics, and depth to bedrock. Because the project has been designed to minimize the use of fertilizers, herbicides, and pesticides by reducing the overall area of managed turf, significant cumulative effects from operation of the facility are not anticipated. Also, a Turf Management Plan and Integrated Pest Management program would be used to regulate the amount and types of products used (see golf course design sheets in Appendix C).

Impacts to water quality would also depend on the proper operation of the marina. Controlling the fuel and oil processes both at the marina and onshore would be of the highest importance. Proper waste disposal and hazardous material handling both by the marina staff and private boaters would be strictly monitored and controlled. The marina would be designed to reduce and control potential pollution sources and mitigate their impacts (see marina environmental features sheet in Appendix C).

The golf course would increase traffic flow to Skiatook Point by 150 to 200 cars per day. Skiatook Point is accessible from the north via county road 1215 (Lake Road) off of State Highway 10. Skiatook Point is accessible from the east via Rogers Blvd (old SH20) off of State Highway 20. Skiatook Point is accessible from the south and west via the lake access road via W. 103rd St. from N. 52nd W. Ave and State Highway 11. The Bureau of Indian affairs will be extending N. 52nd W. Street from W. 103rd St. to 75th St. North to provide better access from the south to the west side of the lake. Tall Chief Cove Campground and the proposed Marina are accessible from the lake access road. Skiatook Economic Development Authority (SEDA) is working with the county, state, and federal agencies on improving the lake access road and other roads within the lake area.

As originally planned and authorized by Congress, the Skiatook Lake project anticipated much greater development of recreational areas and larger visitor numbers than have occurred to date. The Final Environmental Statement prepared for Skiatook Lake identified a total of seven public use areas to be developed on 1350 acres of USACE managed lands. The proposed lease area would consist of approximately 47% of the acreage identified to be developed at the lake (631 acres of proposed leased lands divided by 1350 acres identified to be developed) and just over 3% of the total project lands and water comprising the Skiatook Lake project (677 acres of total lease area divided by 20,000 acres of USACE managed lands). Prior to construction an average annual visitation of 1,455,000 people was estimated for the lake, which would have been supported in part by the seven proposed public use areas. Visitation to Skiatook Lake has never approached that anticipated prior to construction. Instead, annual visitation at Skiatook Lake has averaged slightly more than 586,000 during fiscal years 1999-2002. Cumulative impacts experienced at Skiatook Lake to date have not reached the levels originally contemplated, nor will they even with the addition of the CrossTimbers project.

USACE is updating the project master plan to reflect changes to the land use allocations for intensive and low-density use. There are approximately 80 acres that would require changing from low density to high density - 20 acres for the marina and 60 acres for the proposed adjacent cabin locations (depending on where the boundaries are drawn). The proposed area for the camping loop, conference center and golf course are already identified as recreation - intensive use and would not require any revision. The approximately 66 acres between the Dam and Tornado Cove would remain low density and available for hiking, nature trails, and other low density uses.

Other indirect and cumulative impacts considered in this evaluation are summarized in Table 2.

V. MITIGATION REQUIREMENTS

During the planning phase of Skiatook Lake, the Fish and Wildlife Service (USFWS) was funded to conduct appropriate fish and wildlife studies and make recommendations for mitigation features in accordance with the Fish and Wildlife Coordination Act (FWCA). The project was also coordinated with the Oklahoma Department of Wildlife Conservation (ODWC) who concurred in the USFWS recommendations. By letter dated 8 February 1966, the USFWS first reported on the project and subsequently supplemented the 1966 report with a letter report dated 12 February 1975. These reports are included in Appendix E, along with the District's mitigation analysis and recommended mitigation measures, which have been implemented.

The FWCA reports assessed the impacts of constructing Skiatook Lake including construction of 6 public use areas around the lake and one below the dam. In 1986 construction on most of the public use areas was modified due to enactment of the Water Resources Development Act of 1986 (WRDA 86), which required a cost-share sponsor. Consequently, the originally planned public use area for the proposed CrossTimbers project area was never constructed.

Presently the Skiatook Point area and Tall Chief Cove area are zoned recreation intensive use. The area along the dam to Tall Chief Cove is zoned low-density recreation. Since impoundment, the lake area at the proposed marina site has been open to the public for fishing and other forms of recreational uses. With the proposed project, construction activities would reduce the existing value of the terrestrial resources over that which presently exists, and to lesser extent over that which was originally planned for the area (traditional Corps of Engineers public use facilities). The difference, however, is that the project was originally planned and impacts to fish and wildlife resources evaluated for the traditional types of Corps of Engineers land and water based recreational development. Typically, this would have included construction of facilities associated with camping, picnicking, boating, and swimming.

The proposed development includes non-traditional features such as golf courses, lodges, cabins, and marinas, which are quite different, and impacts of these facilities were not considered by the resource agencies in 1966 or 1975. Consequently, there would be some additional impact above that originally considered in the project FES and CAR due to the intensive use associated with the proposed changes in types of activities and construction activities. To date, this difference is uncertain and has not been quantified or evaluated by a habitat based evaluation. However, the proponent has agreed to develop mitigation for both

TABLE 2
Indirect and Cumulative Impacts

Issue	No Action Alternative	CrossTimbers Project
Roads	No insignificant or significant impacts; no mitigation measures would be required.	Long-term significant beneficial; no mitigation would be required.
Schools	No insignificant or significant impacts; no mitigation measures would be required.	Long-term significant beneficial; no mitigation would be required.
Potable Water	No insignificant or significant impacts; no mitigation measures would be required.	No insignificant or significant impacts: no mitigation would be required.
Water Delivery Systems	No insignificant or significant impacts; no mitigation measures would be required.	Short term insignificant adverse; no mitigation would be required.
Adjacent Development	No insignificant or significant impacts; no mitigation measures would be required.	No insignificant or significant impacts; no mitigation would be required.
Law Enforcement	No insignificant or significant impacts; no mitigation measures would be required.	No insignificant or significant impacts; no mitigation would be required.
Economics	No insignificant or significant impacts; no mitigation measures would be required.	Significant long-term beneficial; no mitigation would be required.
Fire Protection	No insignificant or significant impacts; no mitigation measures would be required.	No insignificant or significant impacts; no mitigation would be required.
Sewage	No insignificant or significant impacts; no mitigation measures would be required.	No insignificant or significant impacts; sewage facilities will be constructed in accordance with all applicable laws.
Socio-economics	No insignificant or significant impacts; no mitigation measures would be required.	Significant long-term beneficial to local and regional area; insignificant adverse to taxpayer; no mitigation measures would be required.
Air Quality	No insignificant or significant impacts; no mitigation measures would be required.	No insignificant or significant impacts; no mitigation measures would be required.
Nightglow	No insignificant or significant impacts; no mitigation measures would be required.	No insignificant or significant impacts; lighting will be designed such that no mitigation measures will be required.
Public Access	No insignificant or significant impacts; no mitigation measures would be required.	Significant long-term beneficial; no mitigation measures would be required.
Ratio of proposed project to total project land	No insignificant or significant impacts; no mitigation measures would be required.	No insignificant or significant impacts; no mitigation measures would be required.

the terrestrial and aquatic ecosystems in conjunction with USACE, USFWS and ODWC, and to implement required mitigation measures prior to initiation of construction for each element of the proposed project.

Ultimately, the CrossTimbers Project would be designed and operated according to a comprehensive Environmental Management Plan (EMP). This plan would provide sufficient, detailed descriptions for design, operation, and mitigation features necessary to address all environmental issues identified in this environmental assessment. While this document would provide for comprehensive environmental management, specific details of particular emphasis would include:

- Terrestrial and aquatic mitigation plan coordinated with USACE, ODWC, and USFWS.

- Old growth ancient forest survey mapping and approval of impacts to this unique resource by the USACE project delivery team;

- Establishing provisions for dealing with inadvertent discoveries of cultural resources; and

- Appropriate details for site-specific chemical application rates and related considerations for golf course operations to promote water quality protection.

These specific requirements would likewise become conditions of the lease agreement with the USACE. Prior to initiation of the construction of any project feature (e.g. golf course, marina, etc), the EMP section associated with the feature must be approved by the USACE members of the Skiatook Lake Demonstration Lake Project Delivery Team.

VI. FEDERAL, STATE, AND LOCAL AGENCY COORDINATION.

The draft Environmental Assessment was coordinated with the following agencies having legislative and administrative responsibilities for environmental protection as well as those on the attached mailing list:

U.S. Fish and Wildlife Service
Oklahoma Department of Wildlife Conservation
U.S. Natural Resources Conservation Service
Oklahoma Department of Environmental Quality
Oklahoma State Historic Preservation Officer
Oklahoma State Archaeologist
Osage Nation
Quapaw Tribe
Wichita and Affiliated Tribes
Kiowa Tribe
Comanche Tribe
Oklahoma State Conservationist
Oklahoma Department of Tourism
Oklahoma Department of Transportation
Oklahoma Water Resources Board
Oklahoma National Heritage Inventory
City of Skiatook
City of Tulsa
City of Sand Springs
City of Sapulpa
Indian Nations Council of Government

VII. MAILING LIST FOR CROSSTIMBERS PROJECT EA

Dr. Bob Brooks
State Archeologist
Oklahoma Archeological Survey
111 E. Chesapeake
Norman, OK 73019

Dr. Bob Blackburn
State Historic Preservation Officer
Oklahoma Historical Society
2704 Villa Prom
Shepherd Mall
Oklahoma City, OK 73107

Mr. Anthony Whitehorn
Cultural Resource Management
Osage Nation of Oklahoma
627 Grandview Ave.
Pawhuska, OK 74056

Ms. Carrie Wilson
Quapaw Tribe of Oklahoma
P.O. Box 765
Quapaw, OK 74363

Mr. Gary McAdams, President
Wichita and Affiliated Tribes of Oklahoma
P.O. Box 729
Anadarko, OK 73005

Comanche Tribal Business Committee
HC 32 Box 1720
Lawton, OK 73502

Mr. Sherman Chaddlestone
Cultural Resource Management
Kiowa Indian Tribe of Oklahoma
P.O. Box 369
Carnegie, OK 73015

Mr. Bobbye Jack Jones
State Conservationist
NRCS
Agriculture Center Office Building
Farm Road and Brumley Street
Stillwater, OK 73074

Ms. Sue Woodward, President
Oklahoma Audubon Council
1728 Quaker
Tulsa, Ok 74120

Mr. Mark Coleman, Director
ODEQ
1000 N.E. 10th Street
Oklahoma City, OK 73117-1212

Ms. Jane Jayroe
Cabinet Secretary
Oklahoma Department of Tourism
15 North Robinson, Suite 100

Mr. Glen Cheathum
Waterways Branch
Oklahoma Department of Transportation
P.O. Box 660
Tulsa, Ok 73104-0660

Mr. Gregg Duffy, Director
Oklahoma Department of Wildlife Conservation
1801 N. Lincoln
Oklahoma City, OK 73105

Mr. Ron Suttles, Environmental Programs
ODWC
1801 N. Lincoln
Oklahoma City, OK 73105

Ms. Caryn Vaughn, Director
Oklahoma National Heritage Inventory
111 East Chesapeake St.
Norman, OK 73109

Mr. Derek Smithee, Chief
Water Quality Programs Division
OWRB
3800 North Classen Blvd.
Oklahoma City, OK 73118

Mr. Mike Mathis
Oklahoma Water Resources Board
3800 N. Classen Blvd.
Oklahoma City, OK 73118

Mr. Jerry Brabander, Field Supervisor
U.S. Fish and Wildlife Service
222 S. Houston, Suite A
Tulsa, OK 74127

Mayor, City of Skiatook
PO Box 399
Skiatook, OK 74070

Mayor, City of Tulsa
200 Civic Center
Tulsa, OK 74103

Mayor, City of Sand Springs
PO Box 338
Sand Springs, OK 74063

Mayor, City of Sapulpa
PO Box 1130
Sapulpa, OK 74067

Director,
Indian Nations Council of Governments
201 West 5th St. Suite 600
Tulsa, Ok 74103-4236

Ken Taylor
14660 Dior Drive
Skiatook, OK 74030

Darlene Bricker
12345 Wells Drive
Skiatook, OK 74030

John Nelson
P.O. Box 399
Skiatook, OK 74030

Brooks Lord
13550 W. 173rd Street
Skiatook, OK 74070

Scott and Kristie Carlson
5401 Sunset Road
Skiatook, OK 74070

Bob and Lavona Wyckoff
14650 Tiffany Lane
Skiatook, OK 74070

Jim Aeslar
10890 W. Burton Lane
Skiatook, OK 74070

Beverly Taylor
14790 Chanel Lane
Skiatook, OK 74070

Wayne and Betty Barton
601 W. 5th
Skiatook, OK 74070

Shantelle Sutton
11045 W. 112th Place
Skiatook, OK 74070

Roger Clarke
14765 Chanel Lane
Skiatook, OK 74070

Kevin Stubbs
15501 N. 95th
Skiatook, OK 74070

Robert Butler
1714 S. Boston
Tulsa, OK 74119

Bob Ryan
303 E. 1st.
Skiatook, OK 74070

Virceiniy Bennett
P. O. Box 98
Skiatook, OK 74020

Sam Avant
P.O. Box 9
Skiatook, OK 74070

Jack Rankin
P.O. Box 96
Skiatook, OK 74070

Sherri Preslar
10807 W. Burton Lane
Skiatook, OK 74070

A.B. Bazoutti
402 E. Oak
Skiatook, OK 74070

Larry Harper
4201 W. Country Road
Skiatook, OK 74070

Dave Truelove
H.C. 67 Box 343
Skiatook, OK 74070

John Nielsen
P.O. Box 399
Skiatook, OK 74070

Omar Bayout
608 Tallchief Court
Skiatook, OK 74070

Cliff Taylor
16120 Windhill Cr.
Skiatook, OK 74070

Mike Myer
1807 S. Broadway
Skiatook, OK 74070

Dan Yancey
P.O. Box 399
Skiatook, OK 74070

Roger Williams
110 E. 136th Street N
Skiatook, OK 74070

Jim and Sharon Burton
P.O. Box 669
Skiatook, OK 74070

Carol Mitchell
14630 Valley View Dr.
Skiatook, OK 74070

Osage Log Hoomes
P.O. Box 119
Skiatook, OK 74070

Richard Barton
Crystal Bay Marina
H.C. 67 Box 3500
Skiatook, OK 74070

Kevin Clough
East Ridge Estates
Homeowners Association
P.O. Box 1055
Owasso, OK 74055

Dr. John Lamberton
Northeastern State University – Broken Arrow
3100 E. New Orleans
Broken Arrow, OK 74014

Robert Breuning
North Star Economic Development Council, Inc.
P.O. Box 654
Skiatook, OK 74070

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IX. APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

TABLE 3

RELATIONSHIP OF PLANS TO ENVIRONMENTAL PROTECTION STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS

Polices	compliance of Alternative
Federal	
Archeological and Historic Preservation Act, 1974, as amended, 16 U.S.C. 469, et seq.	All plans in full compliance
Clean Air Act, as amended, 42 U.S.C. 7609, et seq.	All plans in full compliance
Clean Water Act, 1977, as amended, (Federal Water Pollution Control Act) 33 U.S.C. 1251, et seq.	All plans in full compliance
Endangered Species Act, 1973, as amended, 16 U.S.C. 1531, et seq.	All plans in full compliance
Federal Water Protection Recreation Act, as amended, 16 U.S.C. 661, et seq.	All plans in full compliance
Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq.	All plans in partial compliance, additional coordination required
Land Water Conservation Fund Act, 1965, as amended, 16 U.S.C. 4601, et seq.	All plans in full compliance
National Historic Preservation Act, 1966, as amended, 16U.S.C. 470a, et seq.	All plans in full compliance
National Environmental Policy Act, 1970, as amended, 42 U.S.C. 4321, et seq	All plans in full compliance
Native American Graves Protection and Repatriation Act, 1990, 25 U.S.C. 3001-13, et seq.	All plans in full compliance
Rivers and Harbors Act, 33 U.S.C. 401, et seq	Not Applicable
Watershed Protection and Flood Prevention Act, as amended, 16 U.S.C. 1001, et seq.	Not Applicable
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq	Not Applicable

Water Resources Planning Act, 1965	Not Applicable
Floodplain Management (E.O. 11988)	All plans in full compliance
Protection of Wetlands (E.O. 11990)	All plans in full compliance
Environmental Justice (E.O. 12898)	All plans in full compliance
Protection of Children (E.O. 13045)	All plans in full compliance
Farmland Protection Act, 7 U.S.C. 4201, et seq.	All plans in full compliance

Note: Full compliance-Having met all requirements of the statues, Executive Orders, or other environmental requirements for the current stage of planning.

X. LIST OF PREPARERS

U.S. ARMY CORPS OF ENGINEERS

Louis Vogele	Archeologist
Preston Hunter	Skiatook Lake Manager
Greg Bersche	Skiatook Lake Park Ranger

PLANNING DESIGN GROUP

Jim Crosby	Landscape Architect

HECKENKEMPER GOLF COURSE DESIGN

Randy Heckenkemper	Golf Course Designer

NORTHEASTERN STATE UNIVERSITY

John Lamberton, PhD	Environmental Mediator

ALEXANDER CONSULTING INC.

Tom J. Alexander, PhD, PG	Principal-in-Charge

OKLAHOMA STATE UNIVERITY-TULSA

Matt Albright, MS	Environmental Specialist

UNIVERSITY OF TULSA

Donald O. Henry, PhD	Archeologist

OSAGE COUNTY

Scott Hilton	Commissioner

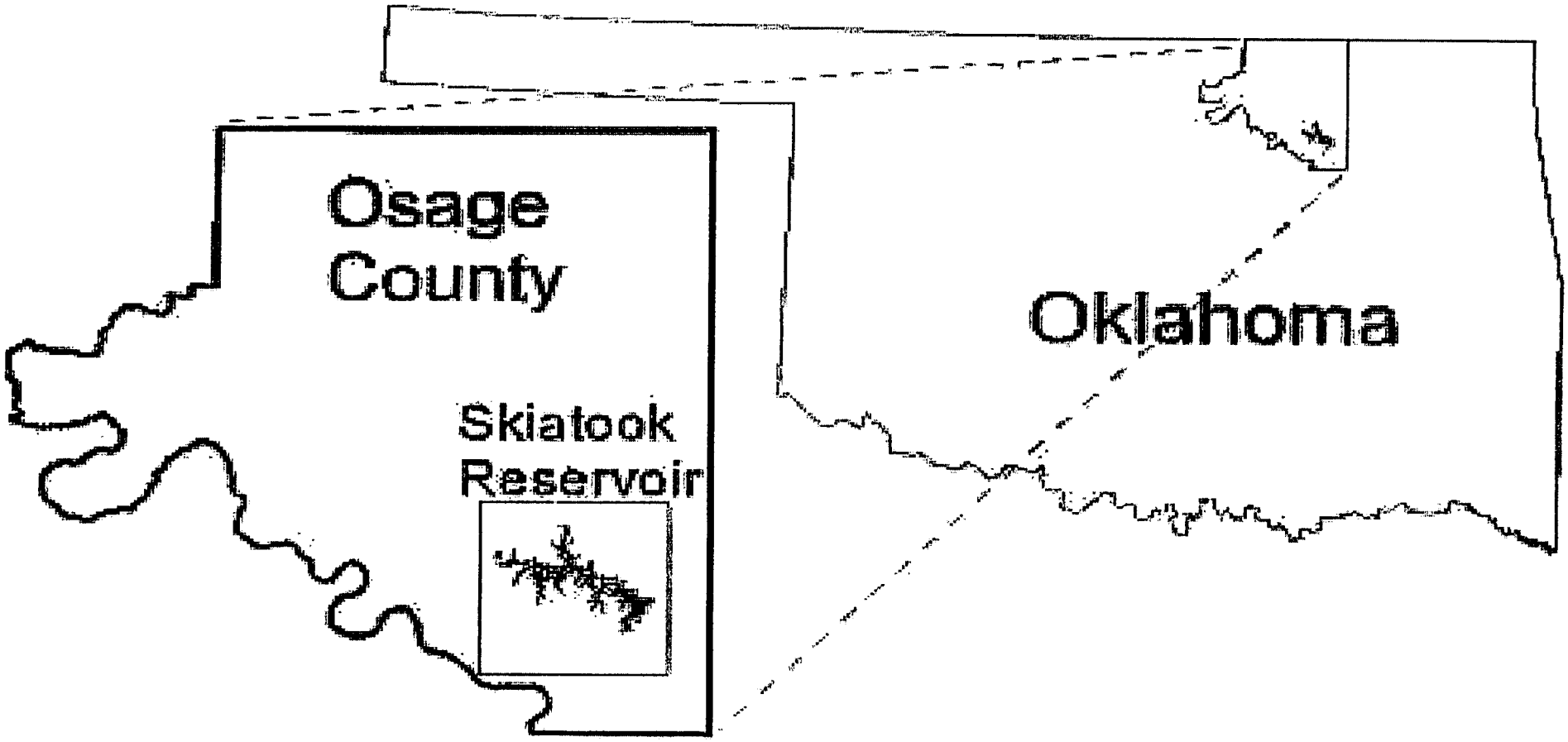


FIGURE 1 - General Vicinity Map, Skiatook Lake, Osage County, Oklahoma

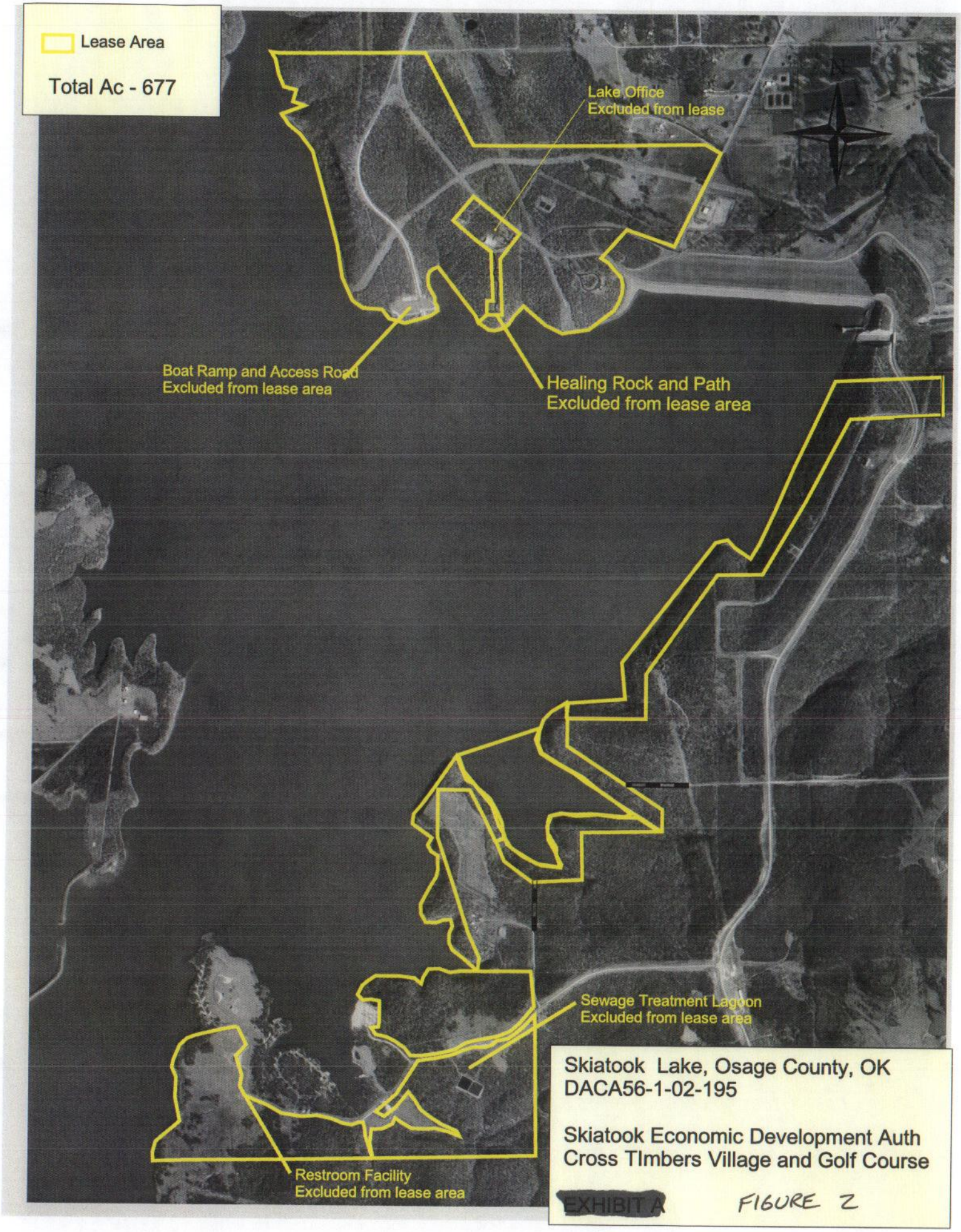
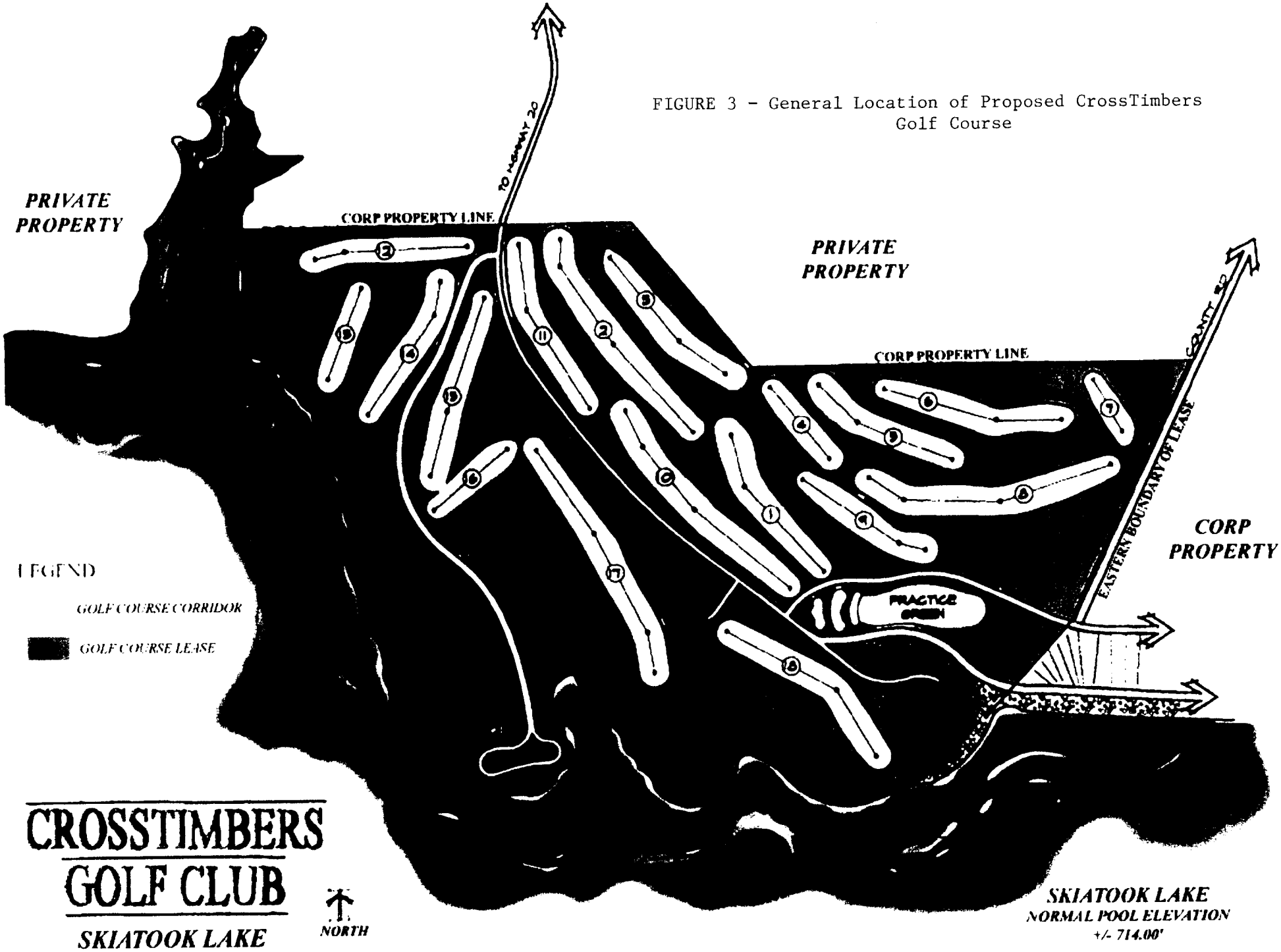

Lease Area
Total Ac - 677
Lake Office
Excluded from lease
Boat Ramp and Access Road
Excluded from lease area
Healing Rock and Path
Excluded from lease area
Sewage Treatment Lagoon
Excluded from lease area
Restroom Facility
Excluded from lease area
Skiatook Lake, Osage County, OK
DACA56-1-02-195
Skiatook Economic Development Auth
Cross TImbers Village and Golf Course
EXHIBIT A
FIGURE 2

FIGURE 3 - General Location of Proposed CrossTimbers Golf Course



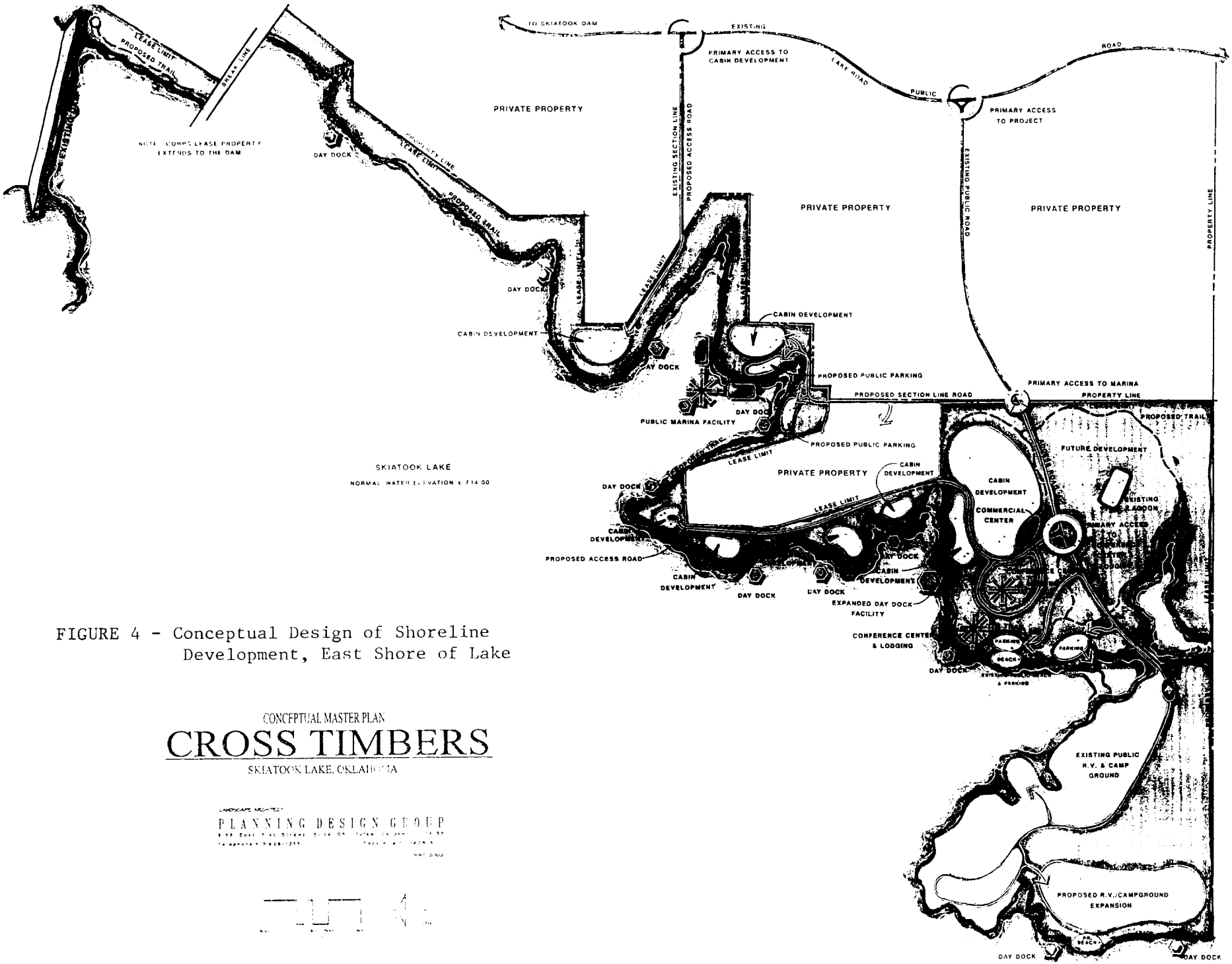


FIGURE 4 - Conceptual Design of Shoreline Development, East Shore of Lake

CONCEPTUAL MASTER PLAN

CROSS TIMBERS

SKIATOOK LAKE, OKLAHOMA

LANDSCAPE ARCHITECT

PLANNING DESIGN GROUP

Skiatook Lake, Osage County, OK

Healing Rock, Access Path
and Project Facility Area

Figure 5 - Area excluded from lease